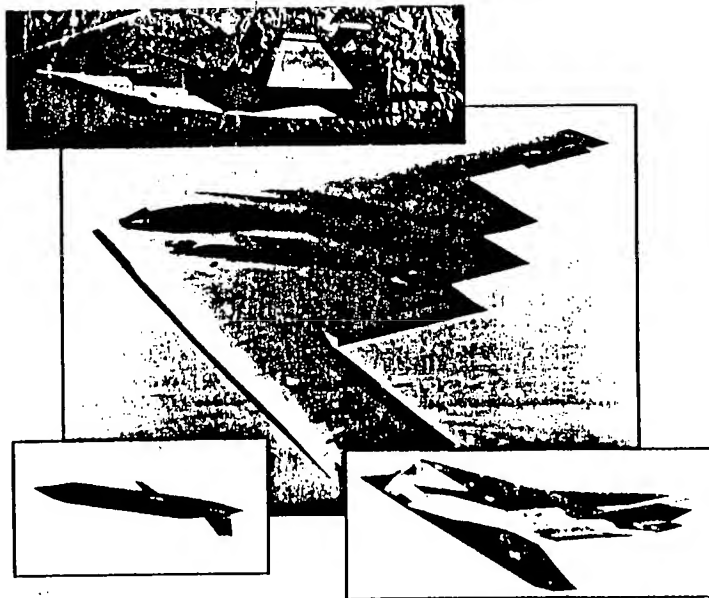




# AIR FORCE STEALTH TECHNOLOGY REVIEW



10 - 14 JUNE 1991

#263  
53 Pgs.

# **STEALTH WEEK BRIEF BOOK INDEX**

<b>VALUE OF STEALTH BRIEFING</b>	<b>TAB A</b>
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<b>F-117 STEALTH FIGHTER</b>	<b>TAB B</b>
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<b>B-2 STEALTH BOMBER</b>	<b>TAB C</b>
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<b>F-22 STEALTH FIGHTER</b>	<b>TAB D</b>
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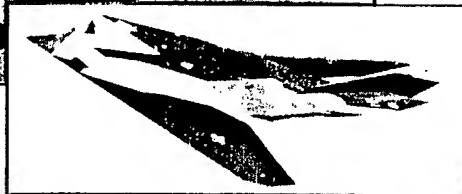
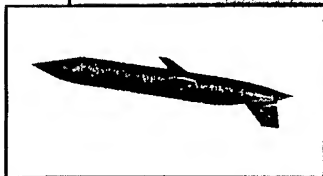
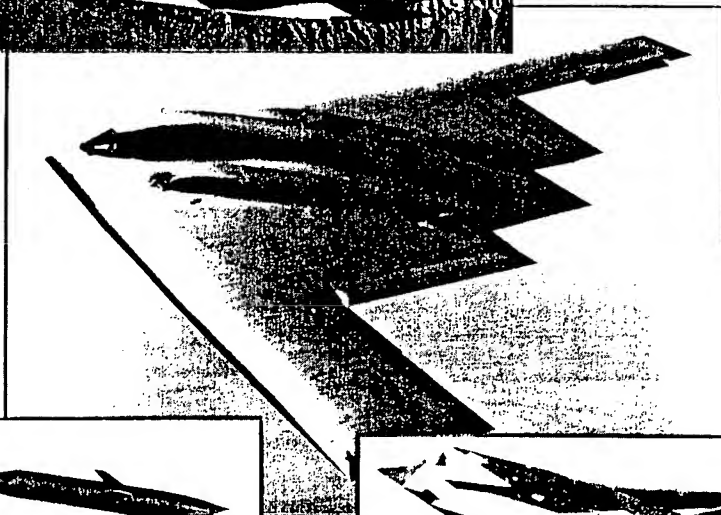
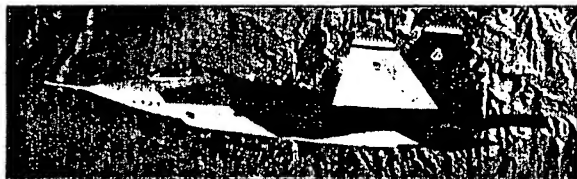
<b>ADVANCED CRUISE MISSILE</b>	<b>TAB E</b>
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TAB A

**VALUE OF STEALTH  
BRIEFING**

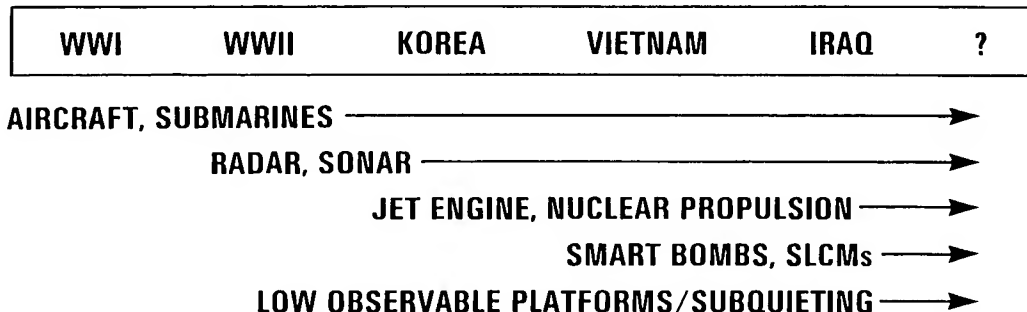


# VALUE OF STEALTH





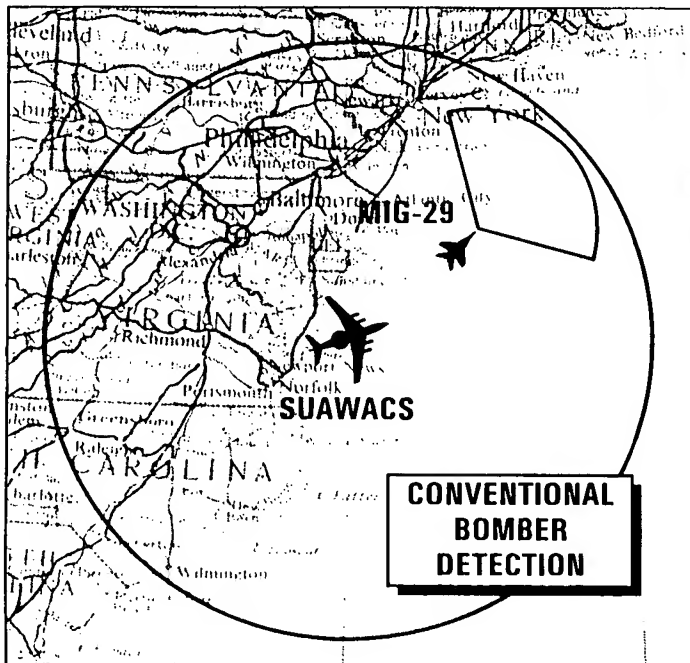
# IMPACT OF TECHNOLOGY ON SURPRISE



- INITIALLY, AIRCRAFT AND SUBMARINES ENJOYED THE BENEFIT OF SURPRISE
- RADAR, SONAR, AND NEW PROPULSION TECHNIQUES CHANGED WARFARE
- LOW OBSERVABLES RESTORED THE ELEMENT OF SURPRISE FOR AIRPLANES
- SURPRISE IS PERISHABLE. OTHER COUNTRIES ARE WORKING HARD TO CATCH UP. THEREFORE, WE MUST CAPITALIZE ON OUR SIGNIFICANT INVESTMENT IN LOW OBSERVABILITY TO ENSURE A LASTING U.S. ADVANTAGE



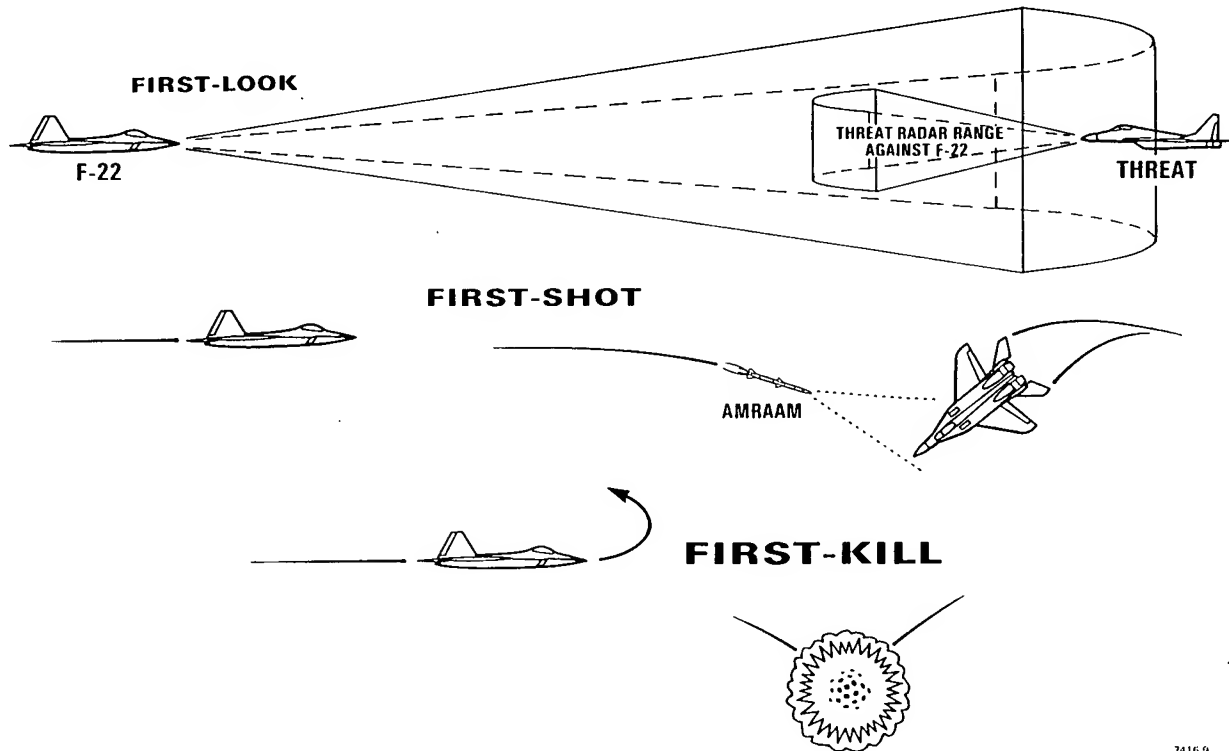
## PENETRATING BOMBER STEALTH EFFECTIVENESS



**WHEN COMPARED TO CONVENTIONAL TARGETS, STEALTH GREATLY DECREASES THE EFFECTIVENESS OF OPERATIONAL RADAR SYSTEMS (e.g., SUAWACS, MIG-29)**



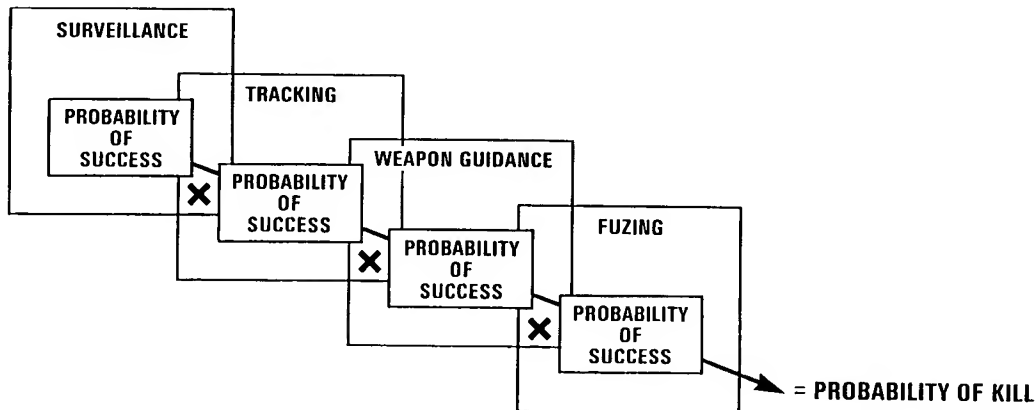
# AIR-TO-AIR FIGHTER STEALTH EFFECTIVENESS





# STEALTH AND SURVIVABILITY

- **LOW OBSERVABLE PLATFORMS, NOW COMBAT PROVEN, HAVE DRAMATICALLY CHANGED THE BATTLEFIELD—THEY CRIPPLE THE ENEMY'S EFFORTS TO DETECT, IDENTIFY, ENGAGE, AND DESTROY OUR FORCES**
  - ENEMY'S RETURN ON INVESTMENT IN AIR DEFENSES IS DENIED
- **RESTORE THE ELEMENT OF SURPRISE**
  - UNITED STATES CHOOSES THE TIME AND PLACE OF ATTACK
  - ENEMY CANNOT REACT EFFECTIVELY

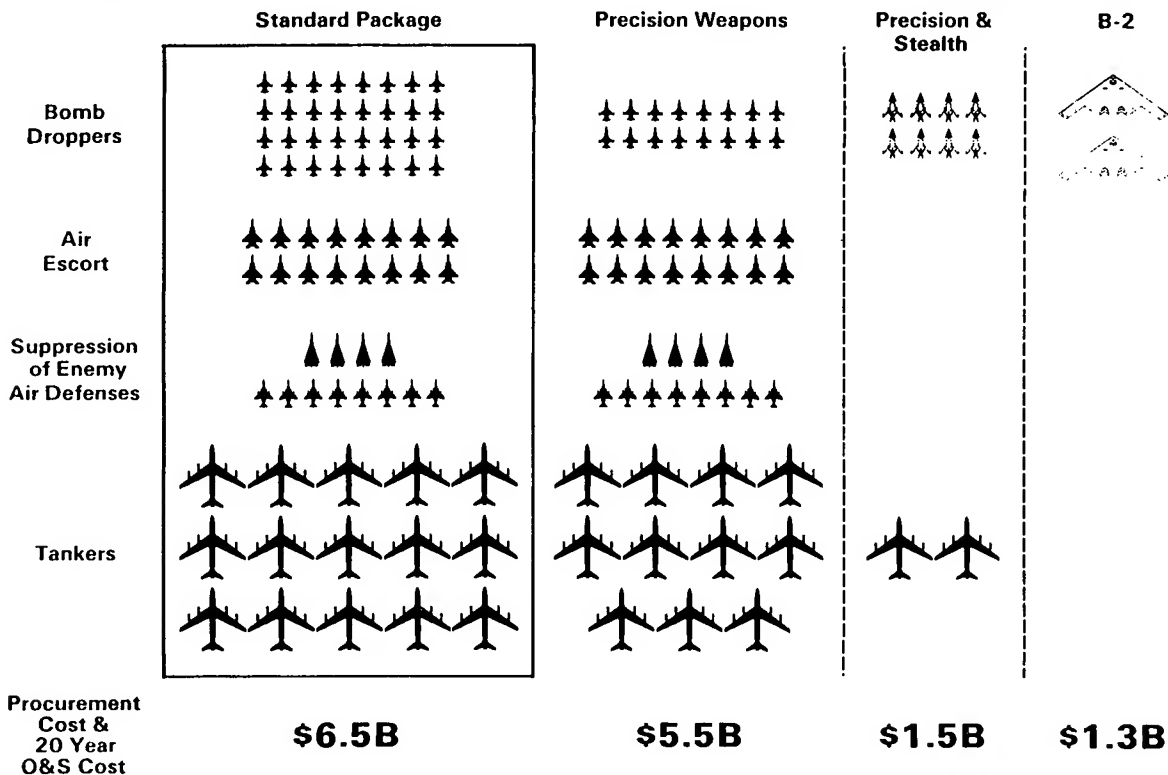


**SUCCESSFUL AIR DEFENSE IS A PROBLEM IN MULTIPLICATION:  
STEALTH DRIVES THE PRODUCT TOWARDS ZERO**





# The Value of Stealth





# OPTIMIZATION OF STEALTH

---

- F-117
  - SECOND-GENERATION STEALTH
  - SIGNATURE OPTIMIZED FOR LIMITED ASPECTS
  - MEDIUM-ALTITUDE, NIGHT GROUND ATTACK
  - PENALTIES IN AERODYNAMIC AND ENGINE PERFORMANCE TO ACHIEVE A HIGH DEGREE OF STEALTH
- ACM
  - THIRD-GENERATION STEALTH
  - FIRST SUCCESSFUL INTEGRATION OF AERODYNAMIC EFFICIENCY AND STEALTH IN A SMALL VEHICLE
- B-2
  - FOURTH-GENERATION STEALTH
  - REVOLUTIONARY BLENDING OF STEALTH TECHNOLOGY IN LARGE AIRCRAFT WITH HIGH AERODYNAMIC EFFICIENCY AND LARGE PAYLOAD
  - BALANCED SIGNATURE FOR OPERATIONS AT BOTH HIGH AND LOW ALTITUDE
- F-22
  - OPTIMIZED FOR AIR-TO-AIR OPERATIONS
  - SIGNATURE OPTIMIZED FOR A FIRST-LOOK/FIRST-KILL CAPABILITY

**COMMON DENOMINATOR ACROSS ALL STEALTH PLATFORMS IS EFFECTIVE MISSION PLANNING, WHICH GREATLY ENHANCES MISSION SURVIVABILITY.**



## **STEALTH PAYOFF HIGH**

---

- **STEALTHY AIRCRAFT CAN PENETRATE WITH FEWER SUPPORT ASSETS AND PRESERVE SURPRISE**
  - LESS RISK TO CREW MEMBERS
- **STEALTHY AIRCRAFT PERMIT MORE RAPID SUPPRESSION OF GROUND-BASED AIR DEFENSES**
  - ELIMINATES REQUIREMENT TO "ROLL BACK" DEFENSES
  - LESS RISK TO OUR GROUND FORCES PERSONNEL
- **STEALTH PERMITS MORE ACCURATE DELIVERY OF MUNITIONS**
  - ELIMINATES NEED FOR EVASIVE ACTIONS—PERMITS CONCENTRATION ON WEAPON DELIVERY
  - LESS RISK TO NONCOMBATANT PERSONNEL FROM COLLATERAL DAMAGE

**STEALTH SAVES LIVES**



# **VALUE OF STEALTH IN COMBAT ENVIRONMENT**

---

- **STEALTH IS KEY ELEMENT**
  - SYNERGISTICALLY COMPLEMENTS OTHER SURVIVABILITY METHODS SUCH AS DEFENSE SUPPRESSION, STANDOFF, AND TACTICS
- **STEALTH APPLIED WHERE NEEDED**
  - PART OF OVERALL FORCE PACKAGE OPTIMIZED TO SUIT AIRCRAFT/MISSION

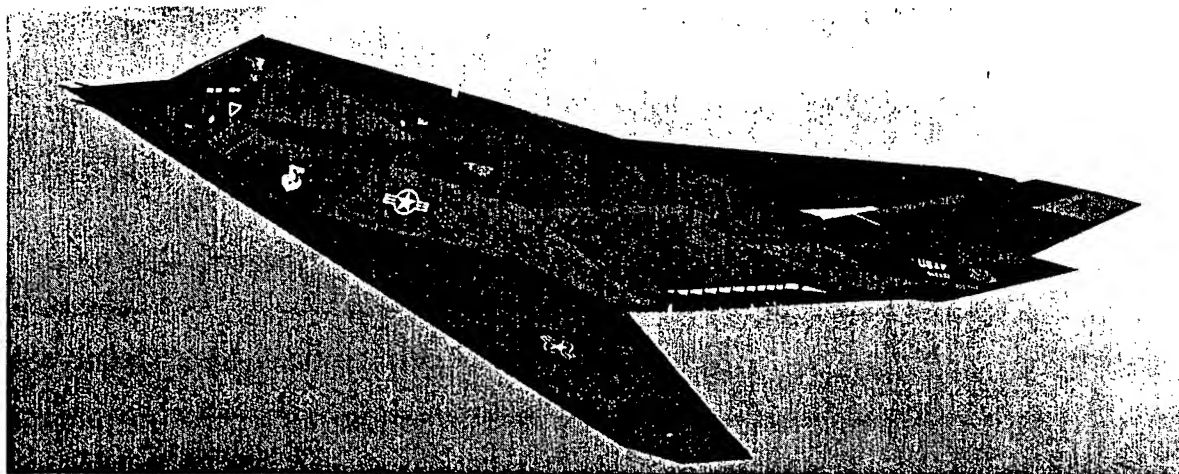
**STEALTH ALLOWS US TO MORE EFFECTIVELY  
USE ALL COMBAT RESOURCES**

TAB B

**F-117 STEALTH FIGHTER**



# **F-117 STEALTH FIGHTER**



**COMBAT-PROVEN STEALTH**

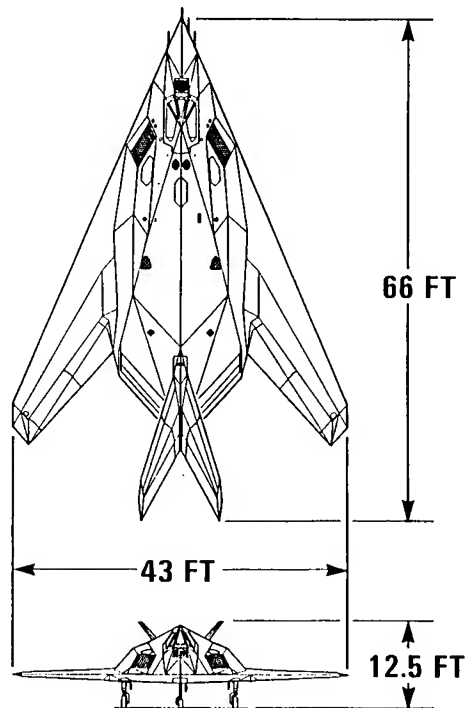


# F-117A CHARACTERISTICS



F-117A  
Stealth Fighter

- MAX GROSS WEIGHT: 52,500 LB
- SPEED: HIGH SUBSONIC
- CREW: ONE
- UNREFUELED RADIUS: 600 NM
- ARMAMENT: TWO 2,000-LB LASER GUIDED/CONVENTIONAL BOMBS; NUCLEAR CAPABLE
- ENGINES: TWO NONAFTERBURNING GE F-404 TURBOFAN ENGINES





# **F-117 MISSION**



**F-117A  
Stealth Fighter**

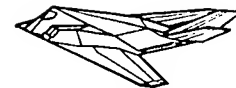
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- **THE F-117A STEALTH FIGHTER IS THE FIRST OPERATIONAL AIRCRAFT CONCEIVED TO EXPLOIT LOW OBSERVABLE STEALTH TECHNOLOGY**
- **THIS SINGLE-SEAT FIGHTER IS DESIGNED TO PENETRATE DENSE THREAT ENVIRONMENTS AND ATTACK HIGH-VALUE TARGETS WITH PINPOINT ACCURACY**





# F-117 PROGRAM



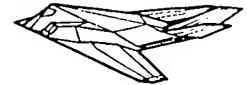
**F-117A**  
**Stealth Fighter**

---

● FIRST FLIGHT (31 MONTHS AFTER FSD CONTRACT AWARD)	JUN 1981
● FIRST AIRCRAFT DELIVERIES	1982
● INITIAL OPERATIONAL CAPABILITY	OCT 1983
● LAST AIRCRAFT DELIVERY	JUN 1990
● TOTAL AIRCRAFT BUY	59
● AIRCRAFT LOST TO PEACETIME ACCIDENTS	3
● FIRST COMBAT OPERATION	JUST CAUSE (DEC 1989)
● UNIT FLYAWAY COST	\$52.5 MILLION (FY 91\$)
● TOTAL PROGRAM COST	\$8.2 BILLION (FY 91\$)



## **F-117 FACT SHEET DESERT STORM**



**F-117A  
Stealth Fighter**

<b>F-117s DEPLOYED:</b>	<b>42</b>
<b>TOTAL COMBAT SORTIES:</b>	<b>OVER 1,270</b>
<b>TONS OF BOMBS DROPPED:</b>	<b>OVER 2,000</b>
<b>NUMBER OF COMBAT HOURS:</b>	<b>OVER 6,900</b>
<b>MISSION CAPABLE RATE:</b>	<b>OVER 85%</b>

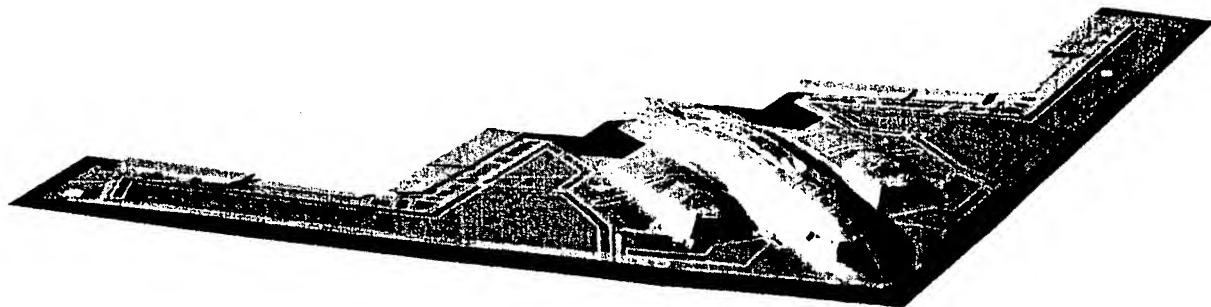
**WHILE F-117s FLEW ONLY 2% OF TOTAL COMBAT SORTIES,  
THEY COVERED APPROXIMATELY 40% OF THE STRATEGIC  
TARGETS—ONLY SYSTEM TO FLY DOWNTOWN BAGHDAD IN  
"TEETH" OF DEFENSES**

TAB C

# **B-2 STEALTH BOMBER**



# **B-2 STEALTH BOMBER**



**GLOBAL REACH-GLOBAL POWER  
FOR THE 21<sup>ST</sup> CENTURY**



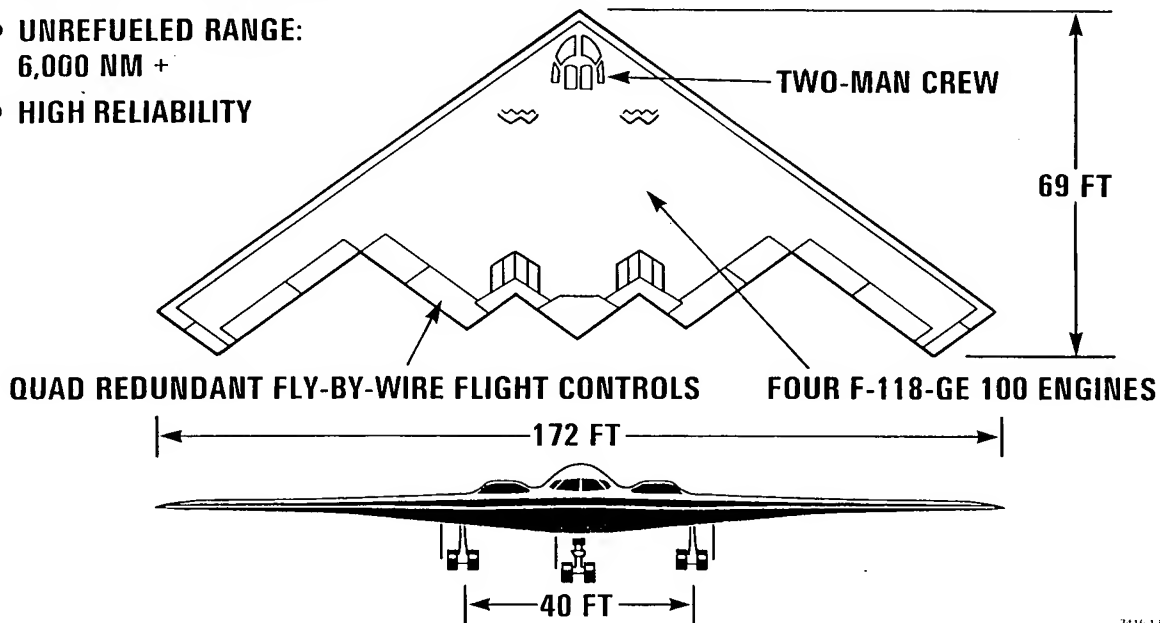
## B-2 CHARACTERISTICS



B-2  
Stealth Bomber

- LARGE NUCLEAR OR CONVENTIONAL PAYLOAD
- PENETRATION SPEED: HIGH SUBSONIC
- ALTITUDE: UP TO 50,000 FEET
- UNREFUELED RANGE:  
6,000 NM +
- HIGH RELIABILITY

ALL FEATURES DESIGNED TO MINIMIZE  
OBSERVABLE, RADAR, INFRARED,  
VISUAL, AND ACOUSTIC SIGNATURES





# **THE ORIGINAL B-2 MISSION STATEMENT**



**B-2  
Stealth Bomber**

**"MISSION: THE ADVANCED STRATEGIC  
PENETRATING AIRCRAFT (ASPA) SHALL  
PROVIDE THE CAPABILITY TO CONDUCT  
MISSIONS ACROSS THE SPECTRUM OF  
CONFLICT, INCLUDING GENERAL NUCLEAR  
WAR, CONVENTIONAL CONFLICT, AND  
PEACETIME/CRISIS SITUATIONS."**

**IN 1981 THE B-2 WAS KNOWN AS THE ASPA. THE NAME  
HAS CHANGED, BUT THE MISSION REMAINS THE SAME**



# **Nuclear Deterrence**

## **Our Number One Priority**



**B-2 Stealth Bomber**

- **DETERRENCE HAS PROVIDED THE FOUNDATION FOR U.S. MILITARY STRATEGY FOR OVER 40 YEARS**
  
- **SOVIET UNION REMAINS THE ONLY NATION THAT CAN DESTROY THE U.S. – WITHIN 30 MINUTES**
  - **THE POTENTIAL FOR NUCLEAR EXCHANGE IS AT ITS LOWEST POINT IN 40 YEARS, HOWEVER...**
    - **THE CONSEQUENCES OF FAILURE TO DETER ARE UNACCEPTABLE**
  - **SOVIETS CONTINUE MODERNIZING THEIR OFFENSIVE AND DEFENSIVE FORCES**
  
- **THE TRIAD IS A TIME-PROVEN HEDGE AGAINST SOVIET TECHNOLOGICAL BREAKTHROUGHS AND U.S. SYSTEM FAILURES**

**OUR REDUNDANT FORCES ARE A HIGH-VALUE INSURANCE POLICY**

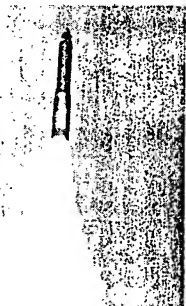


# The Balanced Triad



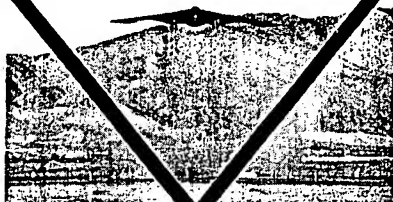
B-2 Stealth Bomber

## ICBMs



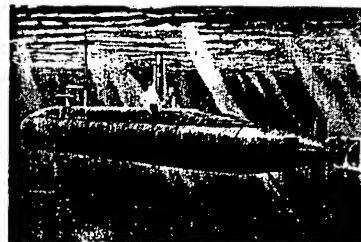
- Use when deterrence fails
- Low O&S cost
- High day-to-day alert
- Immediate response
- No recall
- No recycle
- No conventional use

## STRATEGIC TRIAD BOMBERS



- Demonstrates resolve in crisis before deterrence fails
  - Most stabilizing
- Relieves decision time pressure
- Man-in-loop
- Most efficient weapon delivery
- Survivable
- Recallable
- Reuseable
- Rapid global conventional capability
- Proven in combat

## SLBMs



- Use when deterrence fails
- Survivable
- Low cost/warhead
- Prompt response
- No recall
- No recycle
- No conventional use

**Each President Has Requested More Options**





# B-2: The Next Generation Stealth



B-2 Stealth Bomber

**IF YOU LIKE THE F-117, WAIT TILL YOU SEE THE B-2**

## PRECISION & STEALTH

B-2

**BOMB  
DROPPERS**



**TANKERS**



**\* COST (FY91\$)**

**\$1.5B**

**\$1.3B**

- **BALANCED LOW OBSERVABLE DESIGN**
- **HIGH AND LOW ALTITUDE OPERATION**
- **LONGER RANGE WITH GREATER PAYLOAD**
- **TERRAIN FOLLOWING RADAR**
- **FAR LESS TANKER SUPPORT**

**GREATER OPERATIONAL UTILITY**

\* Procurement and 20 year operations and support

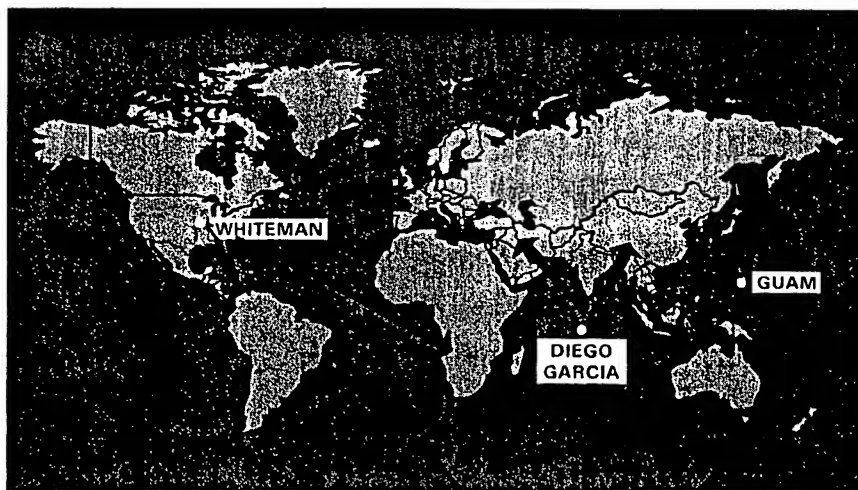


## **B-2 Conventional Capability Worldwide Force Projection Capability**



**B-2 Stealth Bomber**

- **40,000 LB PAYLOAD + ONE REFUELING COVERS GLOBAL LANDMASS**



**B-2 CAN HOLD VIRTUALLY EVERY TARGET  
IN THE WORLD AT RISK WITHIN 24 HOURS**



# Cost Effective Force Multiplier



B-2 Stealth Bomber

- THE VALUE OF A B-2 WILL BE ITS ENDURING CONTRIBUTION TO NATIONAL SECURITY FOR MANY YEARS
- THE B-2 LEVERAGES OUR UP-FRONT INVESTMENT IN STEALTH TECHNOLOGY
- IN AN AUSTERE BUDGET ENVIRONMENT, THE B-2 WILL BE THE CENTERPIECE OF A SMALLER, MORE CAPABLE FORCE

**Commitment to date**

**\$30.8B (TY\$)**

**With Termination Cost**  
(15 A/C - THEN STOP)

**\$36.4B (TY\$)**

**Additional Cost to go**

**\$28.4B (TY\$)**

**"WE HAVE INVESTED A HUGE AMOUNT IN THE B-2 ALREADY. WE ARE AT THE STAGE NOW WHERE WE CAN BEGIN TO REAP THE BENEFITS OF THAT INVESTMENT AND WE WANT TO GO FORWARD WITH THE 75 PLANES."**

**SECRETARY OF DEFENSE**



# Test Reports



B-2 Stealth Bomber

## Block I Testing: Initial Performance Testing

"...from the data available, nothing we have seen would conflict with the expectations that the B-2 should provide a significant capability in range and payload performance and will essentially negate the large investments the Soviets have made in air defense."

Defense Science Board, 20 Jan 1990

"...In general, the B-2 has performed equal to or better than predicted in the areas of performance and flying qualities."

OSD/DOT&E, 11 Jun 1990

## Block II Testing: Initial Low Observable Testing

"Based on flight test results to date, there are no indications that basic B-2 aircraft survivability is in jeopardy."

OSD/DOT&E, 25 Feb 1991

"...we found no substantive signature surprises. Based on our review of the test results, we see nothing that would lead us to believe that the B-2 will not be the highly survivable aircraft intended at the start of this important program."

Defense Science Board, 20 Feb 1991

"The early Block 2 flight tests were responsive to the 1991 full performance matrix requirement of taking early measurements of the radar signature. The test objectives were to provide a preliminary assessment of the radar signature for the first B-2 at selected frequencies intended to be representative of threat radars."

General Accounting Office, 15 Apr 1991

"Flight tests for the second B-2 adequately demonstrated some basic flight characteristics beyond those accomplished in Block 1 testing. The tests also demonstrated that new flight control software corrected flight stability problems identified in Block 1 testing."

General Accounting Office, 15 Apr 1991



## B-2 PROGRAM



B-2  
Stealth Bomber

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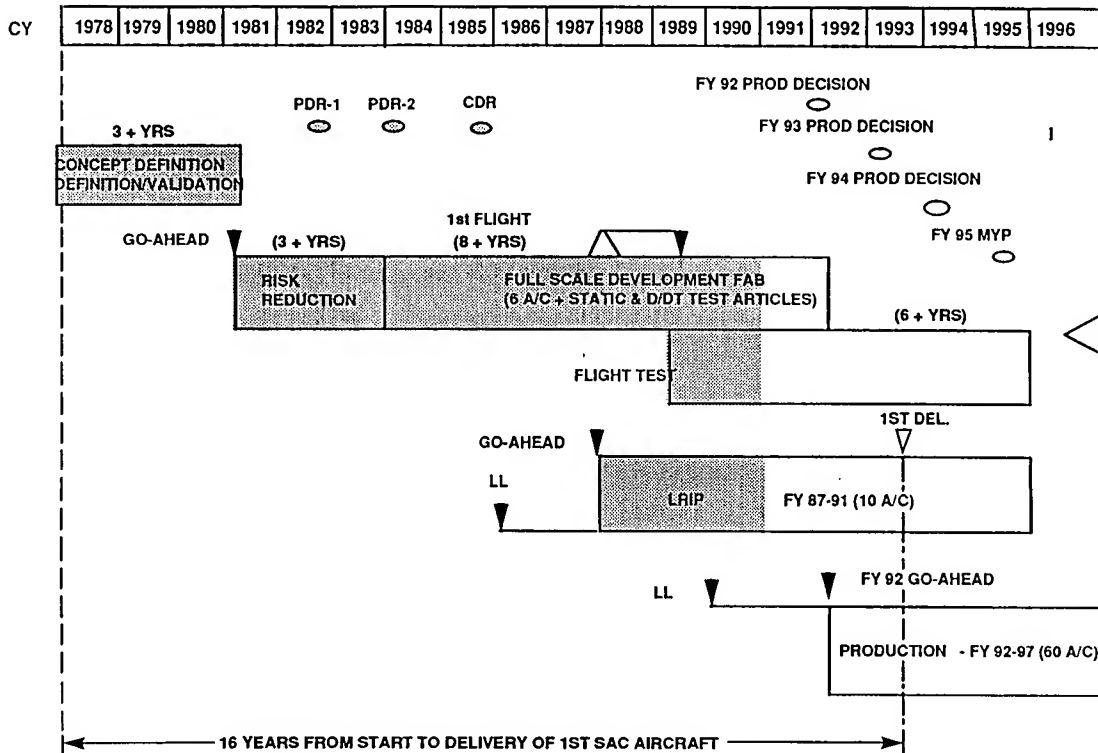
• PROGRAM INITIATION	1981
• FULL SCALE DEVELOPMENT	1983
• LOW RATE PRODUCTION	1987
• FIRST FLIGHT	1989
• FIRST SAC DELIVERY	1993
• TOTAL AIRCRAFT BUY	75 AIRCRAFT; 2 WINGS
• UNIT FLYAWAY COST	\$437.4 MILLION (FY 91\$)
• TOTAL PROGRAM COST	\$60.8 BILLION (FY 91\$)
—COMMITMENT TO DATE	\$33.2 BILLION (FY 91\$)



# B-2 Program Schedule



B-2 Stealth Bomber





## WHY B-2?



B-2  
Stealth Bomber

- **MULTIROLE CAPABILITY**
  - NUCLEAR DETERRENCE—OUR NUMBER ONE PRIORITY
  - CONVENTIONAL WARFIGHTING—COMBINES F-117's SURVIVABILITY WITH RANGE/PAYLOAD OF THE B-52
- **STEALTH PAYOFF HIGH**
  - LESS RISK TO CREW MEMBERS; MORE ACCURATE DELIVERY OF MUNITIONS
- **SUCCESSFUL TEST PROGRAM DEMONSTRATES B-2 WORKS**
  - RESULTS CERTIFIED BY DEFENSE SCIENCE BOARD, INDEPENDENT TESTERS AND GAO
- **TIME IS RIGHT TO CAPITALIZE ON OUR INVESTMENT AND OUR SUCCESS**

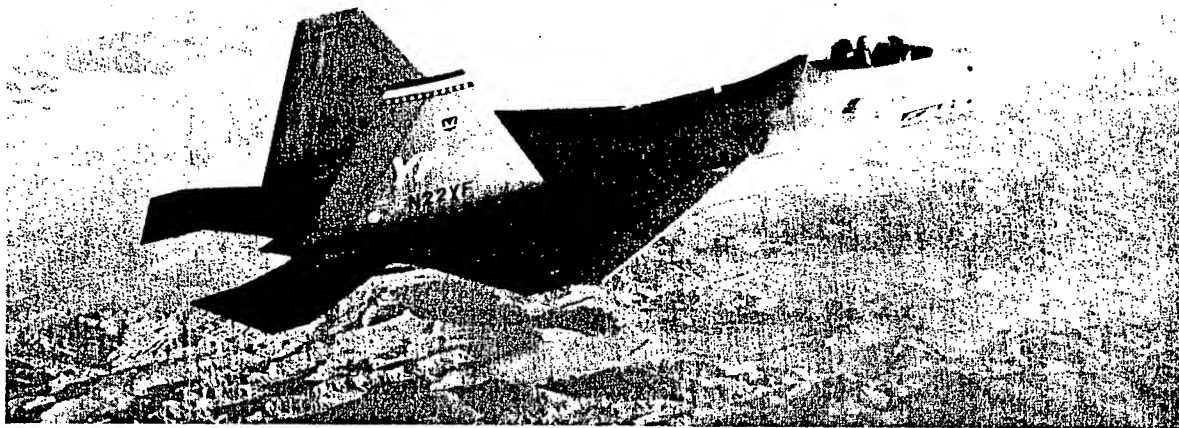
TAB ID

**F-22 STEALTH FIGHTER**





# **F-22 STEALTH FIGHTER**



**AIR SUPERIORITY FOR THE 21<sup>ST</sup> CENTURY**

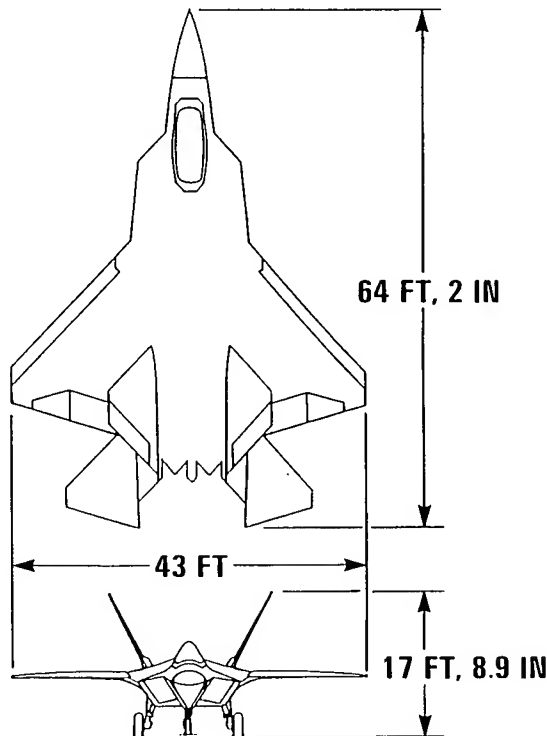


## F-22 CHARACTERISTICS



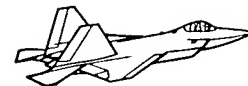
F-22  
Stealth Fighter

- **LOW OBSERVABLE/HIGHLY MANEUVERABLE AIRFRAME**
- **LONG RADIUS OF ACTION WITH EXCELLENT PAYLOAD**
- **MACH NUMBER: 1.8 MACH+**
- **SUPERCruise IN MILITARY POWER: 1.4 MACH+**
- **ALTITUDE: 50,000 FEET**
- **HIGHLY RELIABLE INTEGRATED AVIONICS**
- **CREW: ONE**
- **ENGINES: TWO F119-PW-100**
- **ARMAMENT: AIM-9 SIDEWINDER  
AIM-120 AMRAAM  
20MM GATLING GUN**



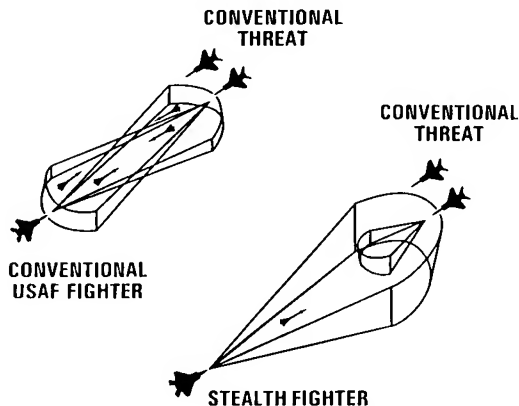


# F-22 MISSION

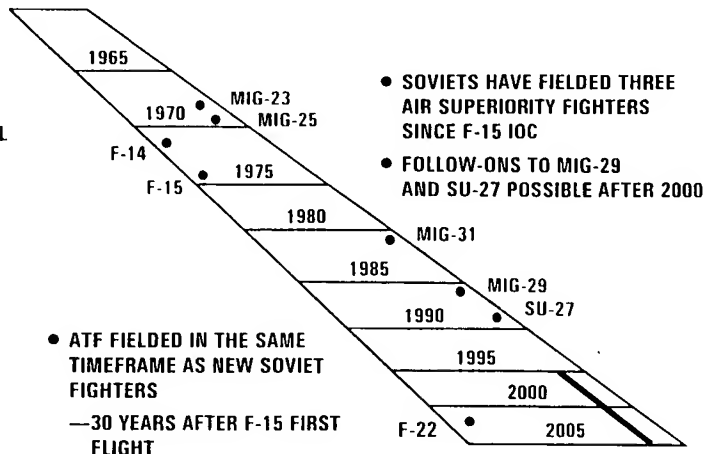


F-22  
Stealth Fighter

## FIRST-LOOK FIRST-SHOT FIRST-KILL



## AIR SUPERIORITY FIGHTERS





## **F-22 DEM/VAL ACHIEVED PERFORMANCE**

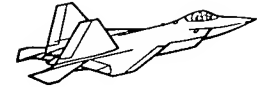


**F-22  
Stealth Fighter**

- **PROTOTYPE AIRCRAFT TESTED IN FOLLOWING AREAS**
  - **THRUST VECTORING**
  - **MANEUVERING TO 60-DEGREE ANGLE OF ATTACK**
  - **AIM-9 AND AIM-120 LAUNCH**
  - **MANEUVERING AT MINIMUM AIRSPEED**
  - **HANDLING QUALITIES DURING TRACKING**
  - **WEAPONS BAY ENVIRONMENT**
  - **MACH 1.8+ (WITH F119 ENGINES)**
  - **AIR REFUELING**
  - **SUPERCUISE**
  - **LIMITED AIR STARTS**



## **F-22 DEM/VAL ACHIEVED PERFORMANCE—Continued**



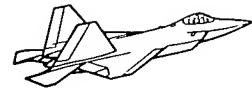
**F-22  
Stealth Fighter**

### **● FLIGHT CONDITIONS**

<b>—AIR SPEED KCAS</b>	<b>83 TO 630</b>
<b>—MACH NUMBER</b>	<b>0.25 TO 1.8 MACH +</b>
<b>—SUPERCruise</b>	<b>1.4 MACH +</b>
<b>—ALTITUDE (FEET)</b>	<b>2,300 TO 50,000</b>
<b>—NORMAL LOAD FACTOR</b>	<b>-1.0 TO 7.7</b>
<b>—ANGLE OF ATTACK (DEGREE)</b>	<b>-5 TO 62</b>
<b>—ANGLE OF SIDESLIP (DEGREE)</b>	<b>1.25 LEFT/RIGHT</b>
<b>—ROLL RATE (DEGREE/SECOND)</b>	<b>200 LEFT/RIGHT</b>

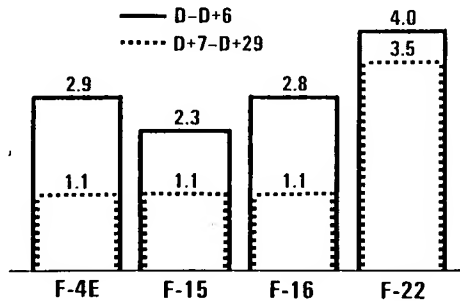


# RM&S COMPARISONS

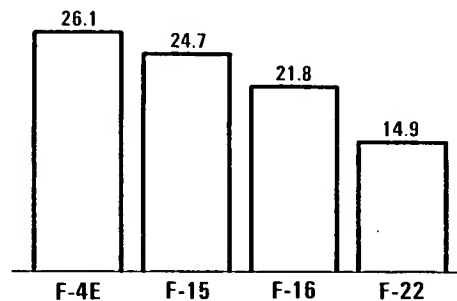


F-22  
Stealth Fighter

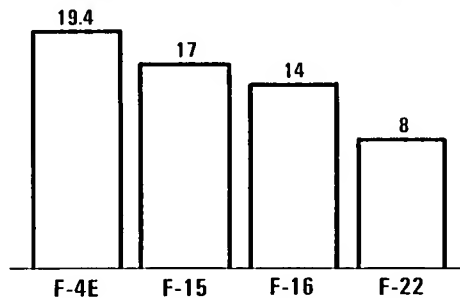
**SORTIE GENERATION RATE**



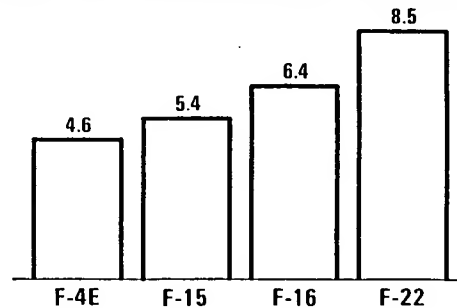
**TOTAL MANPOWER SPACES PER AIRCRAFT**



**C-141s TO DEPLOY A 24 PAA SQDN**

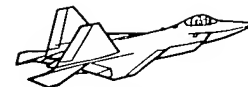


**COMBAT RATE: SORTIES BETWEEN MAJOR MAINTENANCE**





## **F-22 PRATT & WHITNEY YF119 ENGINE**



**F-22  
Stealth Fighter**

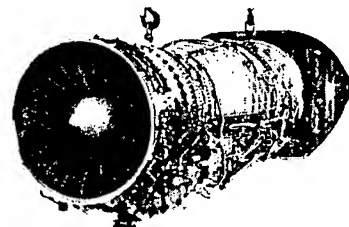
**TMS: YF119-PW-100**

**MFR: PRATT & WHITNEY**

**TYPE: TWIN-SPOOL AUGMENTED TURBOFAN**

**APPLICATION: ADVANCED TACTICAL FIGHTER**

**THRUST: 35,000 LB CLASS**



**ENGINE CONTROL: FULL AUTHORITY DIGITAL  
ELECTRONIC CONTROL**

**COMPRESSION SYSTEM: TWIN-SPOOL/COUNTER-ROTATING/  
AXIAL FLOW**

**—3 STAGE FAN**

**—6 STAGE COMPRESSOR**

**COMBUSTOR: ANNULAR**

**TURBINE: AXIAL FLOW/COUNTER-ROTATING**

**—1 STAGE HIGH-PRESSURE TURBINE**

**—1 STAGE LOW-PRESSURE TURBINE**

**NOZZLE: VECTORING TWO-DIMENSIONAL CONVERGENT-DIVERGENT**



## **F-22 PROGRAM**



**F-22  
Stealth Fighter**

- 
- |   |   |
|---|---|
| • <b>DEMONSTRATION/VALIDATION PHASE</b>     | <b>1986 TO 1991</b>                                       |
| • <b>REQUEST FOR PROPOSAL RELEASE</b>       | <b>1 NOV 1990</b>   |
| • <b>DOWN SELECT</b>                        | <b>23 APR 1991</b>  |
| • <b>DEFENSE ACQUISITION BOARD</b>          | <b>JUN 1991</b>   |
| • <b>ENGINEER MANUFACTURING DEVELOPMENT</b> | <b>JUL 1991</b>   |
| • <b>48 AIRCRAFT DELIVERED</b>              | <b>2002</b>   |
| • <b>TOTAL AIRCRAFT PROCUREMENT</b>         | <b>648 AIRCRAFT TO SUPPORT 5.5 TACTICAL FIGHTER WINGS</b> |
| • <b>UNIT FLYAWAY</b>                       | <b>\$59.4 MILLION (FY 91\$)</b>                           |
| • <b>TOTAL PROGRAM</b>                      | <b>\$61.5 BILLION (FY 91\$)</b>                           |

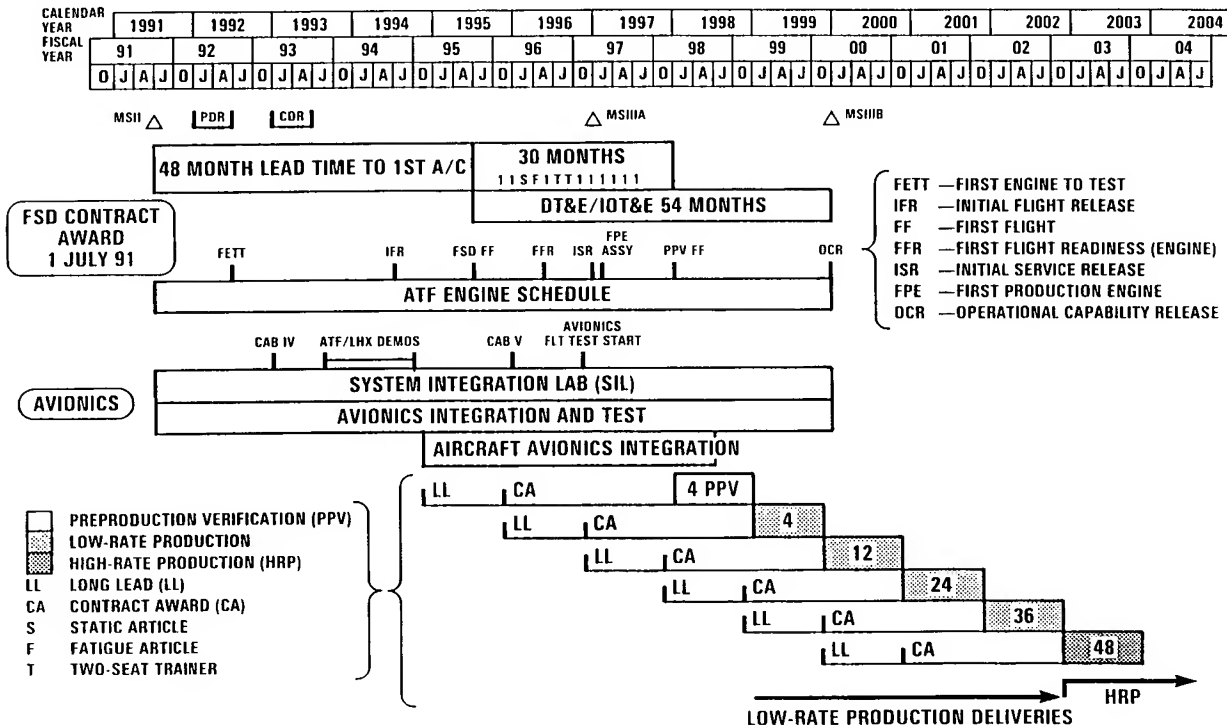




# F-22 FULL-SCALE DEVELOPMENT SCHEDULE



F-22  
Stealth Fighter





## WHY F-22?



F-22  
Stealth Fighter

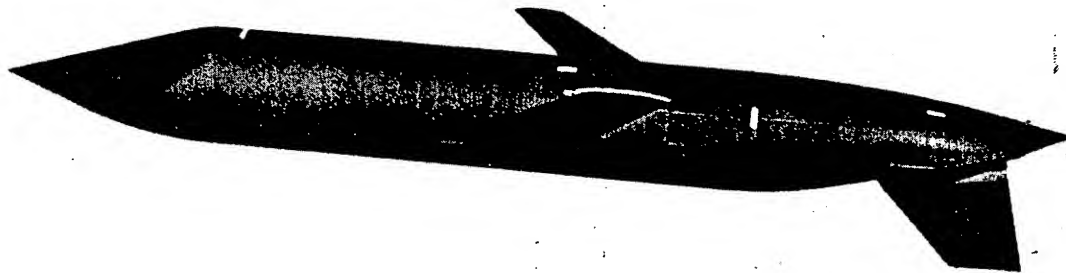
- **FREEDOM OF MANEUVER FOR GROUND, AIR, AND NAVAL FORCES IS A NECESSITY FOR SUCCESSFUL ACCOMPLISHMENT OF MILITARY OBJECTIVES**
- **AIR SUPERIORITY IS REQUIRED TO PROVIDE THIS FREEDOM OF MANEUVER FOR ALL PHASES OF MILITARY OPERATIONS**
  - **PREVENTS ENEMY AIR ATTACK ON FRIENDLY SURFACE FORCES**
  - **ALLOWS INTERDICTION AND CLOSE AIR SUPPORT TO PROVIDE EFFECTIVE SUPPORT OF FRIENDLY FORCES**
  - **ALLOWS SEALIFT AND AIRLIFT AIRCRAFT FREEDOM TO DEPLOY AND RESUPPLY FRIENDLY FORCES**
- **THREATS THAT DENY AIR SUPERIORITY?**
  - **ENEMY FIGHTER AIRCRAFT**
  - **ENEMY SURFACE-TO-AIR MISSILES (SAMs)**

TAB E

**ADVANCED CRUISE  
MISSILE**



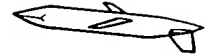
# **ADVANCED CRUISE MISSILE**



**DETERRENCE FOR THIS CENTURY  
AND THE NEXT**



# CRUISE MISSILE EVOLUTION



Advanced  
Cruise Missile

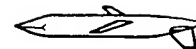
- SLOWLY, AS TECHNOLOGY HAS IMPROVED, THE PERFORMANCE OF CRUISE MISSILES HAS IMPROVED ALSO
- THE FIRST MISSILES ONLY HAD TO FLY A FEW HUNDRED MILES AND BE ABLE TO STRIKE A CITY-SIZED TARGET—AND OFTEN FAILED EVEN IN THAT
- NOW THE MISSILES CAN FLY THOUSANDS OF MILES AND STRIKE WITH GREAT ACCURACY
- THE ADVENT OF NUCLEAR WEAPONS PROVIDES A WARHEAD THAT MAKES A CRUISE MISSILE A SERIOUS DETERRENT



ALCM-B

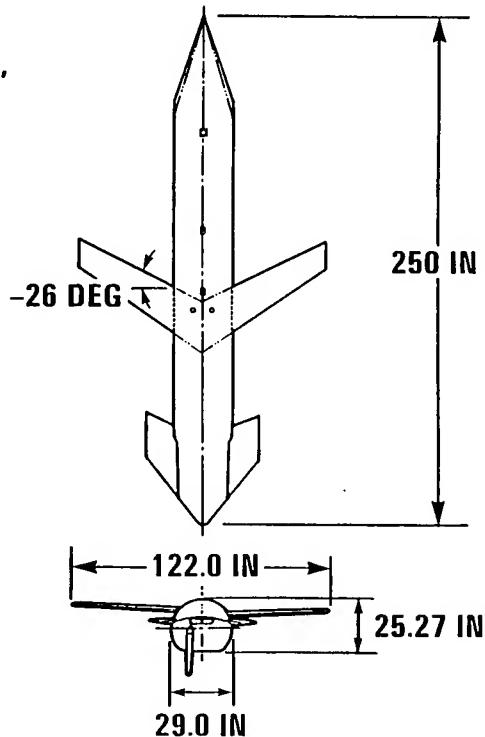


# ADVANCED CRUISE MISSILE CHARACTERISTICS



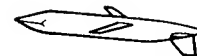
Advanced  
Cruise Missile

- BETTER ACCURACY, RANGE,  
AND SURVIVABILITY
- HARD TARGET CAPABLE
- COMPLICATES ENEMY  
AIR DEFENSES
- INCREASED STANDOFF  
RANGE
- IMPROVES BOMBER  
SURVIVABILITY



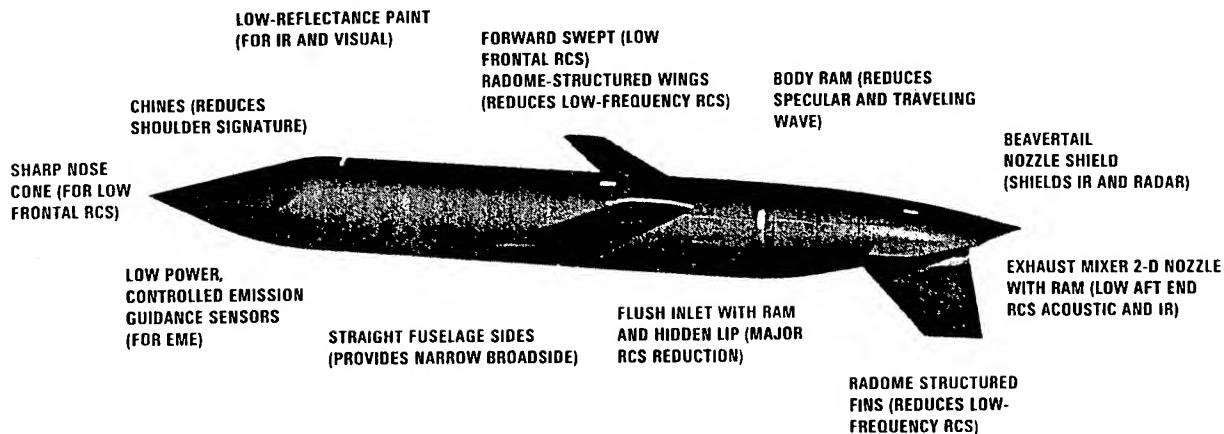


# ADVANCED CRUISE MISSILE (AGM-129A)



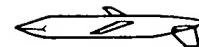
Advanced  
Cruise Missile

## SIGNATURE REDUCTION CHARACTERISTICS





# **ADVANCED CRUISE MISSILE MISSION**



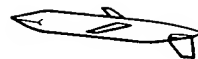
**Advanced  
Cruise Missile**

- **ENHANCE THE LONG-TERM EFFECTIVENESS OF THE BOMBER LEG OF THE TRIAD WITH A CRUISE MISSILE CAPABLE OF DEFEATING PROJECTED SOVIET DEFENSES. ACM HAS**
  - **GREATER RANGE**
  - **IMPROVED SURVIVABILITY**
  - **INCREASED ACCURACY**
  - **ENHANCED OPERATIONAL FLEXIBILITY**
  - **MAXIMUM COMPATIBILITY WITH OTHER STRATEGIC SYSTEMS**



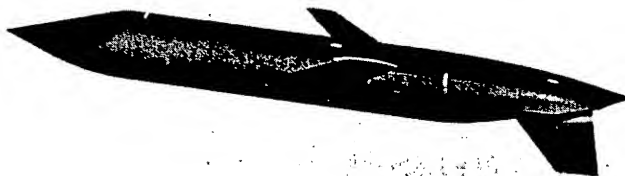


# ACM UNIQUE CONTRIBUTIONS



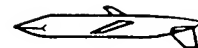
Advanced  
Cruise Missile

- **THE ACM SHARES AN ADVANTAGE WITH THE EARLIEST CRUISE MISSILES: IT GREATLY COMPLICATES ENEMY DEFENSE PLANNING**
- **CRUISE MISSILES ACT AS A FORCE MULTIPLIER: ONE BOMBER ORIGINATES A DOZEN INDEPENDENTLY FLYING THREATS**
- **AND THE ACM ADDS ITS OWN UNIQUE TWIST: IT IS NEARLY UNDETECTABLE EXCEPT AT THE VERY CLOSEST OF RANGES**





# **ACM F-112-WR-100 TURBOFAN ENGINE**



**Advanced  
Cruise Missile**

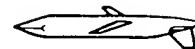
- **LOW BYPASS RATIO TURBOFAN WITH MIXED-FLOW EXHAUST,  
DEVELOPED ESPECIALLY FOR THE ACM**
- **MANUFACTURED BY WILLIAMS INTERNATIONAL COMPANY,  
WALLED LAKE, MICHIGAN**

## **FEATURES**

<b>THRUST CLASS:</b>	<b>500-750 POUNDS</b>
<b>WEIGHT:</b>	<b>161 POUNDS</b>
<b>FUEL TYPE:</b>	<b>JP-10</b>
<b>LENGTH:</b>	<b>31 INCHES</b>
<b>DIAMETER:</b>	<b>18.5 INCHES (WITH ACCESSORIES)</b>



# **ACM GUIDANCE SYSTEM**



**Advanced  
Cruise Missile**

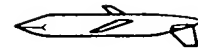
- **A HIGH-ACCURACY INERTIAL NAVIGATION SYSTEM THAT PROVIDES A SIGNIFICANT IMPROVEMENT OVER ALCM**
- **MANUFACTURED BY KEARFOTT GUIDANCE AND NAVIGATION CORPORATION, WAYNE, NEW JERSEY**

## **FEATURES**

- **HIGH-SPEED DIRECT MEMORY ACCESS PROCESSOR WITH 128K OF RANDOM ACCESS MEMORY AND 64K OF ELECTRICAL ERASABLE PROGRAMMABLE READ-ONLY MEMORY**
- **LASER DOPPLER VELOCIMETER SENSOR THAT MEASURES MISSILE GROUND VELOCITY AFTER LAUNCH**
- **FOUR-GIMBAL TUNED ROTOR GYROSCOPE INERTIAL GUIDANCE PLATFORM THAT PROVIDES HIGHLY ACCURATE POSITION LOCATION**



# **ADVANCED CRUISE MISSILE PROGRAM**



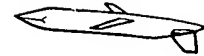
**Advanced  
Cruise Missile**

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● FULL-SCALE DEVELOPMENT BEGAN	APR 1983
● FIRST FLIGHT	JUL 1985
● PILOT PRODUCTION	JUL 1985
● TOTAL BUY (INCLUDING 120 SPECIAL VARIANTS)	1,000
● PRODUCTION DECISION	SUMMER 1991
● UNIT FLYAWAY COST	\$3.8 MILLION (FY 91\$)
● TOTAL PROGRAM COST	\$6.4 BILLION (FY 91\$)



# **ACM TODAY AND TOMORROW**



**Advanced  
Cruise Missile**

- 
- **THE ACM IS NOT JUST DESIGNED TO MEET CURRENT THREATS BUT WILL BE USEFUL WELL INTO THE NEXT CENTURY**
  - **AS MISSILE CARRIER AIRCRAFT AGE AND ARE REMOVED FROM THE CRUISE MISSILE CARRIER OR PENETRATION ROLES, THE ACM CAN BE REDEPLOYED TO EXTEND THE USEFUL LIFE OF AIRCRAFT**
  - **ACM FLEXIBILITY ADDRESSES AIR FORCE STRATEGIC AND BUDGETARY CHALLENGES**